COLORADO RIVER RECOVERY PROGRAM **Project No.: 129**
FY-2006/2007 PROPOSED SCOPE-OF-WORK for:
Population estimate of humpback chub in Desolation/Gray Canyon, Green River, Utah

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Category:
X Ongoing project
___ Ongoing-revised project
___ Requested new project
___ Unsolicited proposal

Expected Funding Source:
X Annual funds
___ Capital funds
___ Other (explain)

I. Title of Proposal:

Population estimate of humpback chub in Desolation/Gray Canyon, Green River, Utah

II. Relationship to RIPRAP:

General Recovery Program Support Action Plan
V. A. 1. Conduct Standardized Monitoring Program

III. Study Background/Rationale and Hypotheses:

In 2002, the RIP set recovery goals for the endangered humpback chub. Recovery goals are based in part on maintaining populations of humpback chub in several locations, among which is the Desolation/Gray canyon population on the Green River. Setting, maintaining, and monitoring a population necessitates obtaining accurate population estimates. Trend monitoring (ISMP) has been conducted annually since 1991. A five-year study on humpback chub reproduction and habitat use 1992-1996 was completed (Chart and Lentsch 1999) as part of the Flaming Gorge studies. However, catch rates were variable and recapture rates low, so a good population estimate could not be produced. An estimate using those data was made by Ron Ryel and Rich Valdez (Recovery Goals 2002).

A three-year population estimate was conducted for the Desolation/Gray Canyon humpback chub population estimate during 2001-2003. Program Capture (M_t model) was utilized to calculate population estimates for each of the three years (2001: 733 ≤ 1,254 ≤ 2,697; 2002: 1,477 ≤ 2,612 ≤ 8,509; 2003: 636 ≤937 ≤ 1,520), with respective profile likelihood intervals (Jackson et al. *draft*). Through the three years of this Desolation/Gray Canyon humpback chub population estimate, the probability of capture (*p*-hat) increased slightly and the coefficient of variation (CV) decreased (2001: *p*-hat=0.054, CV=0.31; 2002: *p*-hat=0.045, CV=0.36; 2003: *p*-hat=0.083, CV=0.21; Jackson et al. *draft*). Slight revision of the previous approach should further increase the probability of capture and decrease the coefficient of variation through an increase effort using multiple techniques.

The recovery goals require that subsequent population estimates for Desolation/Gray Canyon humpback chub be conducted in three out of every five years. This population estimate will meet this direction and provide for six separate point estimates within an eight-year time period. Information collected previously by the Utah Division of Wildlife Resources - Moab Field Station and recommendations from the USFWS population estimate workshops 2002 and 2004 are incorporated into the approach to provide the best opportunity of determining the most accurate and precise estimate for the Desolation/Gray Canyon humpback chub population

IV. Goals, Objectives, End Product:

Goal: To estimate the population size of humpback chub in Desolation/ Gray Canyon with confidence intervals of less than 20%.

Objectives:

1) to obtain a population estimate of late juvenile/adult humpback chub in Desolation/Gray Canyon

2) to determine mean estimated recruitment of naturally produced subadult humpback chub (150-199 mm) in Desolation/Gray Canyon

V. Study area:

Desolation/Gray canyons on the Green River, Utah. Specifically, twelve sites including four long-term trend sites in Desolation/Gray Canyon (RM 184.4, 174, 160, and 145) will be sampled. Sites previously sampled during either ISMP or during the 2001-2003 population estimate will be included (RM 182, 166.5, and 148.8, etc.).

VI. Study Methods/Approach:

Study methods will be similar to those used in the previous population estimate (Chart and Lentsch 1999, Jackson et al. *draft*) and in the Westwater Canyon population estimate (Hudson et al. 2003, in progress). Before sampling begins, we will refine the sampling design and population estimate to include further changes from the direction that comes from the summary of the 2004 population estimate workshop. We believe a more rigorous sampling design than that used in the previous study (Jackson et al. *draft*) may be required to produce an estimate with confidence levels less than 20%.

Three sampling trips will be made in September and October, with intervals of 1-2 weeks between sampling. Twelve sites, including the long-term trend sites, will be sampled for one night. Catch rates of chubs are much lower than those seen in Westwater or Black Rocks, so more than one night may be necessary. Trammel nets and electrofishing will be used to collect chubs; hoop nets may be used to supplement captures. Each site will be electrofished after nets are pulled in the evening. Additional electrofishing may be attempted during the evening crepuscular just prior to that net check in attempt to maximize captures. Six to eight nets will be set in the evening beginning at approximately 1630 hrs and checked every 1.5 to 2 hours to approximately 2230 hrs. Nets will be set again before sunrise and checked through mid-morning. Suitable portions of the river in between sites will also be electrofished when possible. All chubs will be scanned for a PIT tag, tagged if needed, measured (mm) and weighed (g-electronic balance), and released. All chub captured will be identified to species using the criteria described in Douglas et al. (1989,1998); morphological measurements will be taken on all chub. All other endangered species will also be scanned for a PIT tag, tagged if needed, measured (mm) and weighed (g-electronic balance), and released.

All chub will be digitally photographed on a grid in order to later assess questions in morphological identifications. Digital photographs will be assigned a number, which will correspond with other data for the individual fish. Capture-recapture data will be used to

generate population estimates in program CAPTURE. A population estimate will be calculated using the most appropriate model most suitable for the sampling methods used.

VII. Task Description and Schedule:

Complete 3 sampling trips (including monitoring trip) in Desolation Canyon from September-October for a humpback chub population estimate. Data will be entered on the computer and transferred to USFWS by January 15, 2007. A short annual progress report summarizing these data will be completed before the winter Colorado River researchers meeting. A final report will be completed in June 2009. The sampling and reporting schedule will be similar through calendar year 2008.

VIII. Field Season 2006 Work

1. Deliverables/due dates: See above
2. Budget:

Field Season 2006 Budget:

Personnel:			
	Project Leader ($36.52/hr x 10hr/d for 10 person-days)	$	3,652
	2 Biologists ($28.38/hr x 10hr/d for 110 person days)	$	31,218
	Technicians ($16.19hr x 10hr/d for 300 person days)	$	48,570
	Subtotal	$	83,440
Travel / Per Diem:			
	Mileage: Moab to put-in (RM 216) = 150 mi @ $.42 per mi for 3 trips (3 trucks), shuttle of three vehicles @ $300 per trip, $5/day/truck for 2 mos.	$	4,750
	Gas (boats and generator) for 3 trips;	$	2,200
	Per Diem: - 6 people @ $15 per day for 39 days;	$	3,510
	Subtotal	$	10,460
Equipment / Supplies:			
	Equipment Repair and Replacement (outboards, generators, trailers, rafts, oars)	$	6,000
	Miscellaneous: camping equipment (tents, dry bags, stoves, cookware, chairs, tables, toilets, trammel nets, oars, oar blades, life jackets, dip nets, GPS units, digital camera, scales)	$	2,500

	Subtotal	$	8,500
TOTAL		**$**	**102,400**

Field Season 2007 Work

1. Deliverables/due dates: Annual progress report presented at 2007 Colorado River researchers meeting.
2. Budget: $105,472*

Field Season 2008 Work

1. Deliverables/due dates: Annual progress report presented at 2007 Colorado River researchers meeting.
2. Budget: $108,636*

Field Season 2009 Work

1. Deliverables/due dates: Draft final report to peer reviewers and Biology Committee – June 30, 2009
2. Budget: $15,000

* Includes a yearly 3% increase to adjust for increases in the cost of living.

IX. Program Budget Summary

FY-2006	$ 60,000
FY-2007	$123,600
FY-2008	$127,308 (estimate)
FY-2009	$ 20,600 (estimate)
Total	$331,508

X. Reviewers

XI. References

Chart, T.E. and L. Lentsch. 1999. Reproduction and recruitment of *Gila* spp. and Colorado pikeminnow (*Ptychocheilus lucius*) in the middle Green River 1992-1996. Report C in Flaming Gorge Studies: Reproduction and Recruitment of *Gila* spp. and Colorado pikeminnow in the middle Green River. Final Report. Recovery Implementation Program Project #39.

Jackson, J.A. and J. M. Hudson. 2005. Population Estimate for Humpback Chub (*Gila cypha*) in Desolation and Gray Canyons, Green River, Utah 2001-2003. Upper Colorado River Endangered Fish Recovery Program. Draft Report. Recovery

Implementation Project #22k.